State/Industry Network

Air Quality Report

1st Quarter 1999

Prepared By:

Air Quality Monitoring Branch
Division of Environmental Engineering
North Dakota Department of Health

July 1999

TABLE OF CONTENTS

SECTION ONE

DISCUSSION OF

MONITORING RESULTS

Sulfur Dioxide (SO_2)

There were no exceedances of either the State or Federal standards during the quarter. The maximum 1-hour concentration was 131 ppb on March 15 at DGC #12; the maximum 3-hour concentration was 104 ppb on February 11 at Mandan Refinery - SPM; and, the maximum 24-hour concentration was 59 ppb on January 3 at Mandan Refinery - SPM. All sites achieved at least an 80% data recovery for the period operated except Bear Paw - MGP #5.

Bear Paw - MGP #5 failed to achieve 80% data recovery due to equipment failure.

On January 14, the Beulah site was terminated and the equipment moved to a new site North of town near the intersection of Highway 200 and CMC2921 in a mine reclamation area.

A new site, Short Creek - SPM, was established to be part of a trans-boundary monitoring project with Environment Canada and Saskatchewan Environmental and Resource Management. The data will be used to monitor clean-up progress at the Boundary Dam Power Plant and as baseline data for epidemiological studies. This site will be part of a 5-site network with three sites in Saskatchewan and two in North Dakota.

Sulfur Dioxide (SO_2) 5-Minute Average

The maximum 5-minute concentration was 281 ppb on January 1 at Bear Paw - MGP #3.

Hydrogen Sulfide (H_2S)

There were no exceedances of the H_2S standards during the quarter. The maximum 1-hour concentration was 47 ppb on March 14 at Amerada Hess - Tioga #2; the maximum 24-hour concentration was 4 ppb on March 14 at Amerada Hess - Tioga #2; the maximum 3-month concentration was 1 ppb in January at Amerada Hess - Tioga #2. The site achieved at least an 80% data recovery for the period operated.

Ozone (O_3)

There was no exceedance of the ozone standard during the quarter. The maximum observed 1-hour concentration was 67 ppb on March 12 at Sharon. The maximum 8-hour concentration was 65 ppb on March 12 at sharon. All sites achieved at least an 80% data recovery for the period operated except Beulah - North.

Beulah - North failed to achieve 80% data recovery due to an analyzer malfunction.

Nitrogen Dioxide (NO_2)

The maximum 1-hour concentration observed was 89 ppb on March 5 at DGC #12. All sites achieved at least an 80% data recovery for the period operated.

A new site, Short Creek - SPM, was established to be part of a trans-boundary monitoring project with Environment Canada and Saskatchewan Environmental and Resource Management. The data will be used to monitor clean-up progress at the Boundary Dam Power Plant and as baseline data for epidemiological studies. This site will be part of a 5-site network with three sites in Saskatchewan and two in North Dakota.

Inhalable FRM $PM_{2.5}$ Particulates

The maximum 24-hour average concentration was 30.7 $\mu g/m^3$ on January 30 at Fargo NW. All sites achieved at least an 80% data recovery for the period operated except Grand Forks and Bismarck.

Grand Forks - North and Bismarck Residential did not achieve 80% data recovery due to problems with the filter exchange mechanism.

The sampler at Short Creek - SPM was returned to the manufacturer for upgrading and was out of service for the entire quarter.

Inhalable non-FRM $PM_{2.5}$ Particulates

The maximum 24-hour average concentration was 18.5 $\mu g/m^3$ on March 7 at Bismarck Residential. This site achieved at least an 80% data recovery for the period operated.

Inhalable PM_{10} Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour average concentration was 21.8 $\mu g/m^3$ on February 5 at Short Creek - SPM. All sites achieved at least an 80% data recovery for the period operated.

A new site, Short Creek - SPM, was established to be part of a trans-boundary monitoring project with Environment Canada and Saskatchewan Environmental and Resource Management. The data will be used to monitor clean-up progress at the Boundary Dam Power Plant and as baseline data for epidemiological studies. This site will be part of a 5-site network with three sites in Saskatchewan and two in North Dakota.

Inhalable $PM_{2.5}$ Sulfates (SO_4)

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO_2 emissions on inhalable particulate concentrations and visibility. The maximum 24-hour $PM_{2.5}$ sulfate concentration was 5.0 $\mu g/m^3$ on March 13 at Bismarck Residential.

Inhalable PM_{10} Sulfates (SO_4)

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO_2 emissions on inhalable particulate concentrations and visibility. The maximum 24-hour PM_{10} sulfate concentration was 5.5 $\mu g/m^3$ on March 13 at Short Creek - SPM. All sites achieved at least an 80% data recovery for the period operated.

$PM_{2.5}$ Sulfate /$PM_{2.5}$ Analysis

The $PM_{2.5}$ sulfate/$PM_{2.5}$ total mass tables present statistics for $PM_{2.5}$ sulfate and $PM_{2.5}$ total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 µg/m^3 for $PM_{2.5}$ sulfate analysis; 4 µg/m^3 for $PM_{2.5}$ total mass. Statistics for the ratio are produced by evaluating the ratio of the $PM_{2.5}$ sulfate concentration to the $PM_{2.5}$ total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the $PM_{2.5}$ total mass concentration is less than 4 µg/m^3, the $PM_{2.5}$ sulfate concentration can be higher than the $PM_{2.5}$ total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of $PM_{2.5}$ sulfate concentration to $PM_{2.5}$ total mass concentration, only data pairs where both the $PM_{2.5}$ sulfate and $PM_{2.5}$ total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum $PM_{2.5}$ Sulfate/$PM_{2.5}$ total mass ratio was 0.307 (30.7%) on March 13 at Bismarck Residential. The maximum average ratio was 0.172 (17.2%) at Bismarck Residential.

PM_{10} Sulfate/PM_{10} Analysis

The PM_{10} sulfate/PM_{10} total mass tables present statistics for PM_{10} sulfate and PM_{10} total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 µg/m^3 for PM_{10} sulfate analysis; 4 µg/m^3 for PM_{10} total mass. Statistics for the ratio are produced by evaluating the ratio of the PM_{10} sulfate concentration to the PM_{10} total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the PM_{10} total mass concentration is less than 4 µg/m^3, the PM_{10} sulfate concentration can be higher than the PM_{10} total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of PM_{10} sulfate concentration to PM_{10} total mass concentration, only data pairs where both the PM_{10} sulfate and PM_{10} total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum PM_{10} Sulfate/PM_{10} total mass ratio was 0.331 (33.1%) on March 13 at Short Creek - SPM. The maximum average ratio was 0.178 (17.8%) at Short Creek - SPM.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1 - HOUR 1ST MM/DD/HH	1 - HOUR 2ND MM/DD/HH	3 - HOUR 1ST MM/DD/HH	3 - HOUR 2ND MM/DD/HH	24 - HOUR 1ST MM/DD	24 - HOUR 2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
Amerada Hess - Tioga #1	1999	JAN-MAR	2138	48 02/07/14	42 01/18/18	37 01/14/23	36 01/18/20	7 01/14	7 02/07	2.0			25.6
Amerada Hess - Tioga #3	1999	JAN-MAR	2140	124 02/26/18	101 02/26/21	97 02/26/20	88 02/26/23	38 02/26	19 02/27	3.4			31.6
Bear Paw - MGP #3	1999	JAN-MAR	2146	64 01/01/16	16 01/10/06	23 01/01/17	12 01/10/08	5 01/01	5 01/10	1.5			15.5
Bear Paw - MGP #5	1999	JAN-MAR	1604 ***	21 01/20/06	15 01/20/09	13 01/20/08	12 01/20/11	5 01/20	4 03/24	1.5			16.6
Beulah	1999	JAN-JAN	326	18 01/09/07	16 01/08/01	14 01/09/08	12 01/14/02	8 01/07	7 01/11	5.1			98.2
Beulah - North	1999	JAN-MAR	1823	64 03/17/05	59 03/17/15	30 03/17/08	29 03/17/17	16 03/17	8 01/18	2.2			32.4
DGC #12	1999	JAN-MAR	2145	131 03/15/11	76 03/17/03	47 03/15/11	27 03/17/05	8 03/15	7 03/17	2.1			26.0
DGC #14	1999	JAN-MAR	2146	30 01/18/12	29 02/16/16	18 01/18/14	16 02/16/17	6 01/18	5 03/10	2.0			34.5
DGC #16	1999	JAN-MAR	2022	44 01/18/11	40 01/18/12	30 01/18/14	19 01/18/11	12 01/18	9 03/24	3.8			69.4
DGC #17	1999	JAN-MAR	2055	48 03/16/02	36 01/18/13	25 01/18/14	23 03/29/23	9 01/10	8 01/06	2.4			24.4
Dunn Center	1999	JAN-MAR	2145	18 01/07/23	17 01/23/22	12 02/16/20	11 01/23/23	4 01/10	4 03/05	1.6			24.1
Fargo NW	1999	JAN-MAR	2148	9 01/03/18	9 01/03/19	7 01/03/20	6 01/19/08	3 01/01	3 01/19	1.4			24.8
Hannover	1999	JAN-MAR	2144	63 01/19/18	57 03/31/11	37 03/31/17	35 02/16/11	16 03/31	7 02/16	2.3			35.7
Mandan Refinery - SPM	1999	JAN-MAR	2142	131 02/12/00	129 01/17/20	104 02/11/02	100 03/20/08	59 01/03	40 02/11	7.5			46.3

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : SULFUR DIOXIDE (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMUM 1 - HOUR 1ST MM/DD/HH	MAXIMUM 1 - HOUR 2ND MM/DD/HH	MAXIMUM 3 - HOUR 1ST MM/DD/HH	MAXIMUM 3 - HOUR 2ND MM/DD/HH	MAXIMUM 24 - HOUR 1ST MM/DD	MAXIMUM 24 - HOUR 2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
Mandan Refinery NW - SPM	1999	JAN-MAR	2149	118 01/01/10	77 03/21/10	67 01/01/11	63 02/19/20	34 02/22	26 02/04	5.2			53.1
Sharon	1999	JAN-MAR	2148	10 01/07/20	9 01/06/02	8 01/06/02	8 01/07/20	4 01/07	4 01/09	1.2			11.0
Short Creek - SPM	1999	FEB-MAR	802	42 03/02/14	41 03/02/09	25 03/02/14	22 03/01/14	8 03/02	5 03/17	1.8			12.3
TRNP - SU (Painted Canyon)	1999	JAN-MAR	2142	12 01/11/22	11 01/11/23	9 01/01/02	9 01/20/05	4 01/01	4 01/26	1.3			15.9
White Shield	1999	JAN-MAR	2147	52 01/18/15	38 01/18/17	40 01/18/17	17 02/18/17	9 01/18	6 02/19	1.9			21.0

The maximum 1-hour concentration is 131 ppb at DGC #12 on 03/15/11
The maximum 3-hour concentration is 104 ppb at Mandan Refinery - SPM on 02/11/02
The maximum 24-hour concentration is 59 ppb at Mandan Refinery - SPM on 01/03

* The air quality standards are:
  STATE Standards -
    1) 273 ppb maximum 1-hour average concentration.
    2) 99 ppb maximum 24-hour average concentration.
    3) 23 ppb maximum annual arithmetic mean concentration.

  FEDERAL Standards -
    1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
    2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
    3) 30 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide 5-Minute Averages (ppb)

LOCATION	YEAR	PERIOD	OBS	5 - M I N U T E M A X I M A 1ST	DATE MM/DD/HH	2ND	DATE MM/DD/HH	3RD	DATE MM/DD/HH	# HOURS >600	% >MDV
Bear Paw - MGP #3	1999	JAN-MAR	2146	281	01/01/16	33	01/01/11	29	01/09/20	0	22.7
Bear Paw - MGP #5	1999	JAN-MAR	1605	61	01/20/06	49	03/20/16	41	01/20/07	0	30.5
Beulah	1999	JAN-JAN	326	36	01/06/23	33	01/06/10	29	01/11/19	0	98.2
Beulah - North	1999	JAN-MAR	1823	162	03/17/15	156	03/17/14	136	03/17/09	0	44.2
Dunn Center	1999	JAN-MAR	2145	54	01/07/22	34	01/07/23	24	01/26/12	0	32.6
Fargo NW	1999	JAN-MAR	2148	9	01/03/18	9	01/03/19	7	01/11/06	0	24.8
Hannover	1999	JAN-MAR	2144	105	01/19/18	79	03/19/11	77	03/31/16	0	45.1
Mandan Refinery - SPM	1999	JAN-MAR	2142	248	02/27/19	217	02/27/00	188	01/08/09	0	59.4
Mandan Refinery NW - SPM	1999	JAN-MAR	2149	174	01/31/18	167	01/31/10	152	03/21/09	0	65.7
Sharon	1999	JAN-MAR	2148	10	01/07/20	9	01/07/02	8	01/07/18	0	11.0
Short Creek - SPM	1999	FEB-MAR	802	172	03/01/13	135	03/01/13	130	03/01/12	0	20.4
TRNP - SU (Painted Canyon)	1999	JAN-MAR	2142	12	01/11/22	11	01/11/23	11	01/20/04	0	15.9

The maximum 5-minute concentration is 281 ppb at Bear Paw - MGP #3 on 01/01/16

* No Standard is currently in effect:

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Hydrogen Sulfide (ppb)

				M A X I M A								
				1 - HOUR		24 - HOUR		3 - MONTH				
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD	1ST MM	2ND MM	ARITH MEAN	1HR #>200	24HR #>100	% >MDV
Amerada Hess - Tioga #2	1999	JAN-MAR	2141	47 03/14/17	34 02/18/06	4 03/14	4 03/21	1 01	1 03	1.4			12.8

The maximum 1-hour concentration is 47 ppb at Amerada Hess - Tioga #2 on 03/14/17
the maximum 24-hour concentration is 4 ppb at Amerada Hess - Tioga #2 on 03/14
The maximum 3-month concentration is 1 ppb at Amerada Hess - Tioga #2 on 01

* The State air quality standards are:
1) 10 ppm maximum instantaneous (ceiling) concentration not to be exceeded.
2) 200 ppb maximum 1-hour average concentration not to be exceeded more than once per month.
3) 100 ppb maximum 24-hour average concentration not to be exceeded more than once per year.
4) 20 ppb maximum arithmetic mean concentration averaged over three consecutive months.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Ozone (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMUM 1-HOUR			MAXIMUM 8-HOUR			1HR	8HR
				1ST MM/DD/HH	2ND MM/DD/HH	3RD MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	3RD MM/DD/HH	#>120	#>80
Beulah	1999	JAN-JAN	6	2 10/11/4	2 10/11/4	2 10/00/0	2 10/11/4	0 99/99/9	0 99/99/92		
Beulah - North	1999	JAN-MAR	998 ***	53 03/17/12	53 03/20/14	53 03/17/11	51 03/17/09	49 03/29/09	49 03/26/10		
Dunn Center	1999	JAN-MAR	2150	57 03/17/13	56 03/17/12	55 02/23/15	54 03/17/09	51 03/17/08	51 03/17/07		
Fargo NW	1999	JAN-MAR	2148	66 03/13/15	65 03/12/14	65 03/13/14	60 03/13/09	54 03/13/10	54 03/13/08		
Hannover	1999	JAN-MAR	2147	58 03/17/17	55 03/17/16	54 03/15/16	52 03/20/13	50 03/20/12	50 03/20/11		
Sharon	1999	JAN-MAR	2147	67 03/12/15	67 03/12/16	65 03/12/14	65 03/12/12	61 03/12/14	61 03/12/13		
TRNP - SU (Painted Canyon)	1999	JAN-MAR	1996	61 03/26/14	58 03/26/13	57 03/26/12	54 03/26/09	50 03/26/11	50 03/26/10		

The maximum 1-hour concentration is 67 ppb at Sharon on 03/12/15
The maximum 8-hour concentration is 65 ppb at Sharon on 03/12/12

* The air quality standards for ozone are:
STATE - 120 ppb not to be exceeded more than once per year.

FEDERAL Standards -
1) 120 ppb maximum 1-hour concentration with no more than one expected exceedance per year.
2) Fourth highest daily maximum 8-hour averages for a 3-year period not to exceed 80 ppb.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1-HOUR 1ST MM/DD/HH	MAXIMA 1-HOUR 2ND MM/DD/HH	ARITH MEAN	% >MDV
Beulah	1999	JAN-JAN	327	27 01/07/07	26 01/08/06	4.6	87.8
Beulah - North	1999	JAN-MAR	1821	24 02/16/01	20 01/16/22	3.1	69.2
DGC #12	1999	JAN-MAR	2114	89 03/05/09	53 02/01/12	5.3	95.2
DGC #17	1999	JAN-MAR	2067	49 03/29/22	37 02/09/20	3.9	85.5
Dunn Center	1999	JAN-MAR	2142	22 03/24/04	11 03/05/19	1.7	34.2
Fargo NW	1999	JAN-MAR	2144	53 03/11/19	50 03/11/20	7.9	83.0
Hannover	1999	JAN-MAR	2138	27 03/30/01	25 03/24/08	3.2	87.7
Sharon	1999	JAN-MAR	2144	13 01/20/01	12 01/13/21	2.2	57.3
Short Creek - SPM	1999	FEB-MAR	800	15 03/02/09	13 03/02/08	2.7	71.8

The maximum 1-hour concentration is 89 ppb at DGC #12 on 03/05/09

* The air quality standards are:
STATE - 53 ppb maximum annual arithmetic mean.

FEDERAL - 53 ppb annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable FRM $PM_{2.5}$ Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 24-HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#> 65	AM>15	% >MDV
Beulah - North	1999	JAN-MAR	15	4.8	21.2 03/07	20.9 03/13	15.5 02/11	10.8			100.0
Bismarck Residential	1999	JAN-MAR	14	1.7	24.4 03/16	23.0 02/20	22.5 03/19	12.2			92.8
Fargo NW	1999	JAN-MAR	21	5.2	30.7 01/30	26.7 02/26	19.3 03/16	12.4			100.0
Grand Forks - North	1999	JAN-MAR	13	6.7	30.0 03/13	26.3 02/26	19.6 02/23	14.6			100.0
Sharon	1999	JAN-MAR	14	2.0	27.4 03/13	21.3 01/30	14.0 02/23	9.3			100.0

The maximum 24-hour concentration is 30.7 µg/m3 at Fargo NW on 01/30

* The ambient air quality standards are:
FEDERAL Standards -
1) 24-hour: 3-year average of 98th percentiles not to exceed 65 µg/m3.
2) Annual: 3-year average not to exceed 15µg/m3.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable non-FRM $PM_{2.5}$ Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 24-HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#> 50	AM>20	% >MDV
Bismarck Residential	1999	JAN-MAR	15	4.6	18.5 03/07	16.3 03/13	12.5 02/05	9.9			100.0

The maximum 24-hour concentration is 18.5 µg/m3 at Bismarck Residential on 03/07

* The ambient air quality standards are:
FEDERAL Standards -
1) 24-hour: 3-year average of 98th percentiles not to exceed 65 $\mu g/m^3$.
2) Annual: 3-year average not to exceed 15$\mu g/m^3$.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM_{10} Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 24-HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#>150	AM>50	% >MDV
Dragswolf	1999	JAN-MAR	15	2.8	16.6 03/13	14.8 03/07	12.5 01/18	7.1			73.3
Fargo NW	1999	JAN-MAR	15	4.3	19.8 03/13	17.4 01/30	15.6 02/23	11.5			100.0
Short Creek - SPM	1999	JAN-MAR	14	5.2	21.8 02/05	21.5 03/07	16.6 03/13	12.1			100.0
White Shield	1999	JAN-MAR	15	2.3	17.4 03/07	15.3 03/13	10.6 03/25	7.6			86.6

The maximum 24-hour concentration is 21.8 $\mu g/m3$ at Short Creek - SPM on 02/05

* The STATE and FEDERAL air quality standards are:
1) 150 $\mu g/m^3$ maximum averaged over a 24-hour period with no more than one expected exceedance per year.
2) 50 $\mu g/m^3$ expected annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable $PM_{2.5}$ Sulfates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMUM 24-HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#>15.	AM>5.	% >MDV
Bismarck Residential	1999	JAN-MAR	15	0.7	5.0 03/13	3.7 03/07	2.8 01/24	1.8			100.0

The maximum 24-hour concentration is 5.0 µg/m3 at Bismarck Residential on 03/13

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM_{10} Sulfates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMUM 24-HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#>15.	AM>5.	% >MDV
Fargo NW	1999	JAN-MAR	15	0.5	2.7 03/13	2.5 03/01	2.1 02/23	1.5			100.0
Short Creek - SPM	1999	JAN-MAR	14	0.9	5.5 03/13	5.2 03/07	3.2 03/01	2.1			100.0

The maximum 24-hour concentration is 5.5 µg/m3 at Short Creek - SPM on 03/13

* No standard is currently in effect.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : $PM_{2.5}$ Sulfate/PM_{25} Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMUM 1ST MM/DD	MAXIMUM 2ND MM/DD	MAXIMUM 3RD MM/DD	ARITH MEAN
Bismarck Residential	1999	JAN-MAR	15	10	30.7 03/13	28.3 01/18	26.9 01/24	17.2

The maximum 24-hour ratio is 30.7 percent at Bismarck Residential on 03/13

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : PM_{10} Sulfate/PM_{10} Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMUM 1ST MM/DD	MAXIMUM 2ND MM/DD	MAXIMUM 3RD MM/DD	ARITH MEAN
Fargo NW	1999	JAN-MAR	15	6.5	26.9 03/01	20.0 01/18	18.6 01/24	13.1
Short Creek - SPM	1999	JAN-MAR	14	6.0	33.1 03/13	28.8 01/12	24.6 03/01	17.8

The maximum 24-hour ratio is 33.1 percent at Short Creek - SPM on 03/13

* No standard is currently in effect.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

NONE

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

NONE